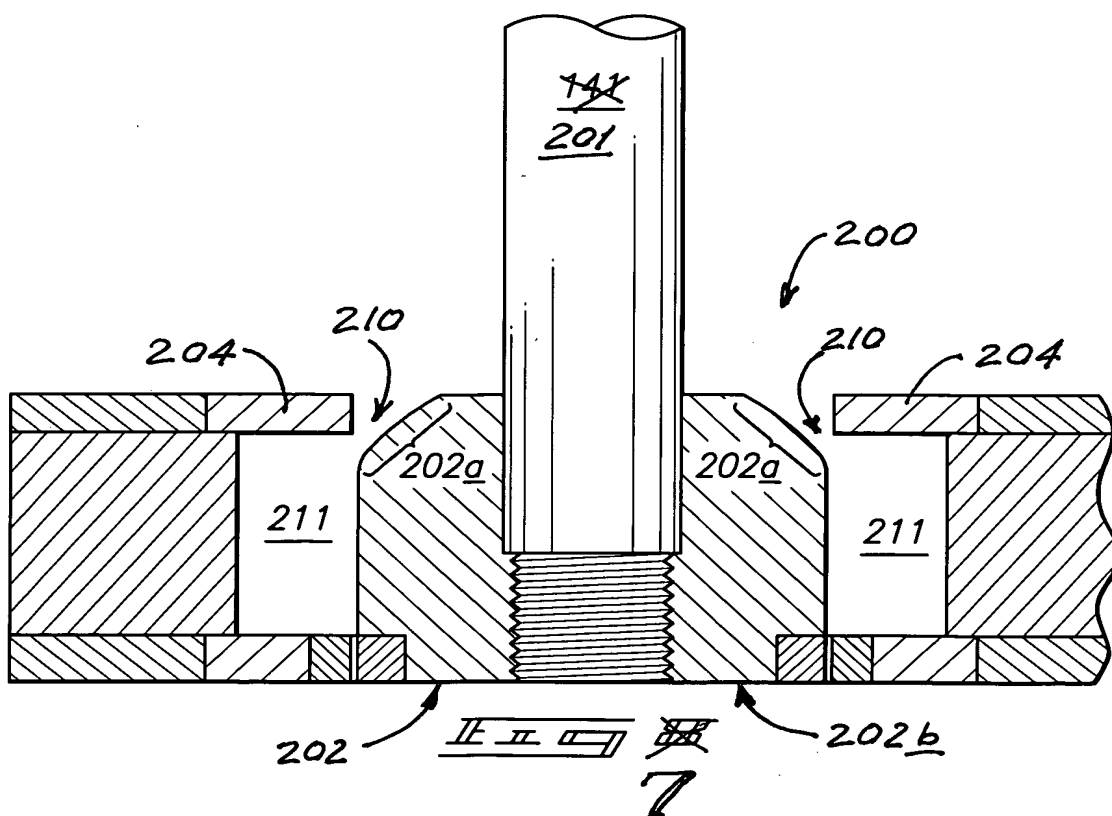
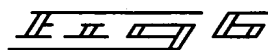
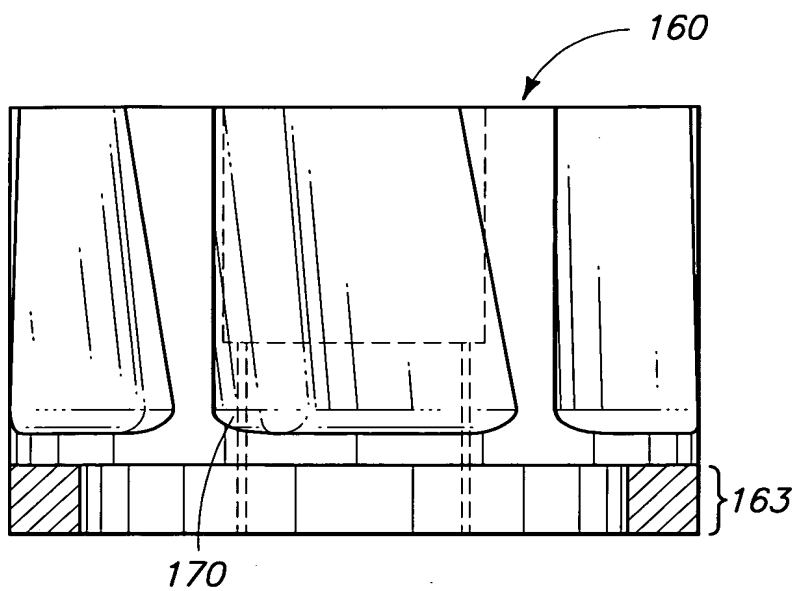
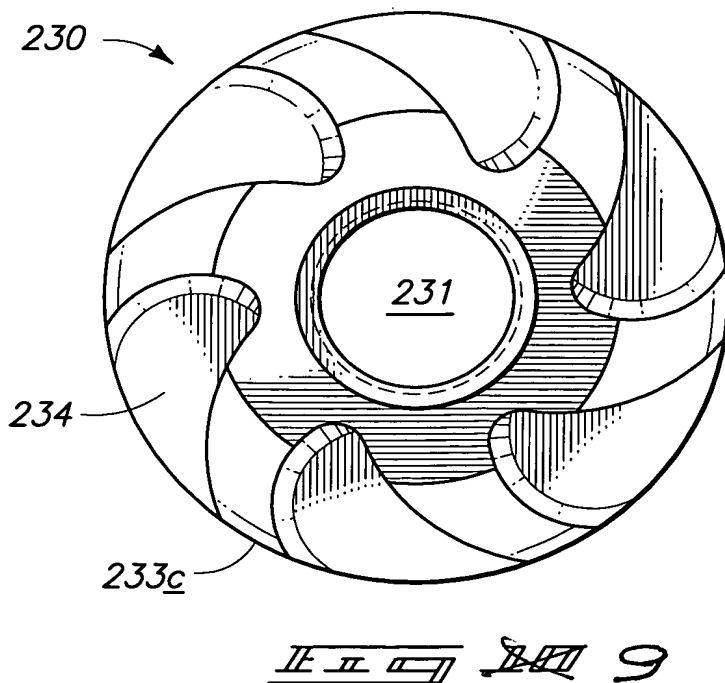
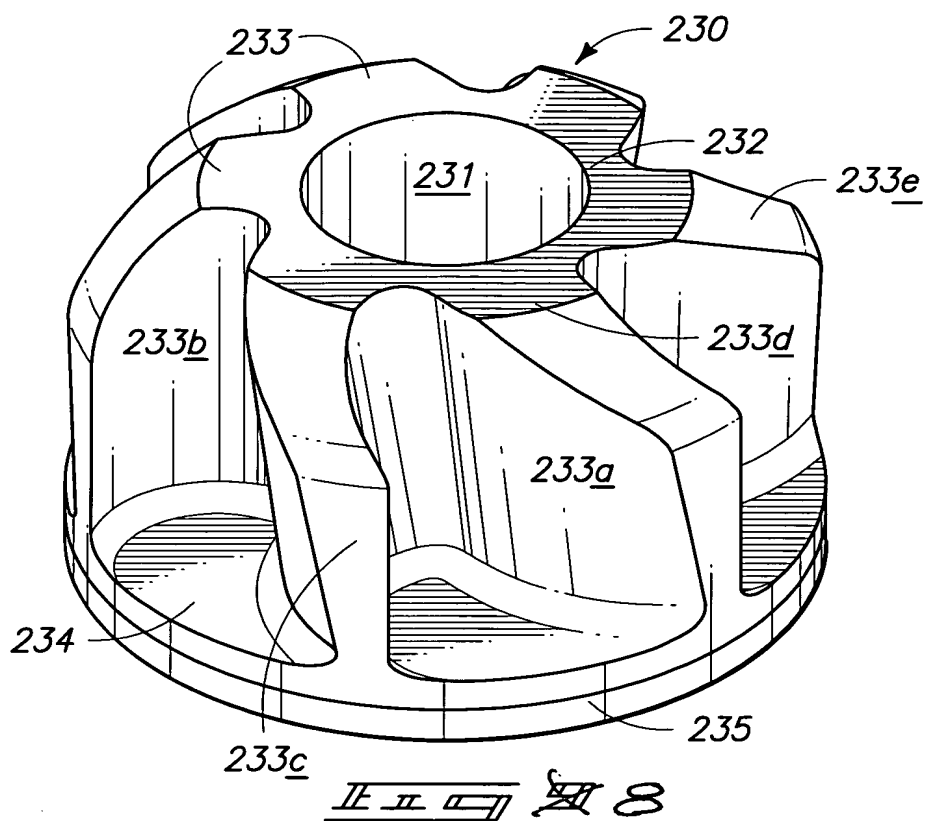
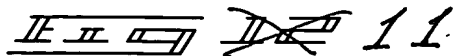


## **APPENDIX**

1. Annotated Sheets Showing Changes – Pages 1 through 8 (Figures 1-15).
2. Replacement Sheets – Pages 1 through 8 (Figures 1-14).
3. Information Disclosure Statement document filed 10/26/05.
4. Preliminary Amendment and Information Disclosure Statement documents filed 1/2/04.



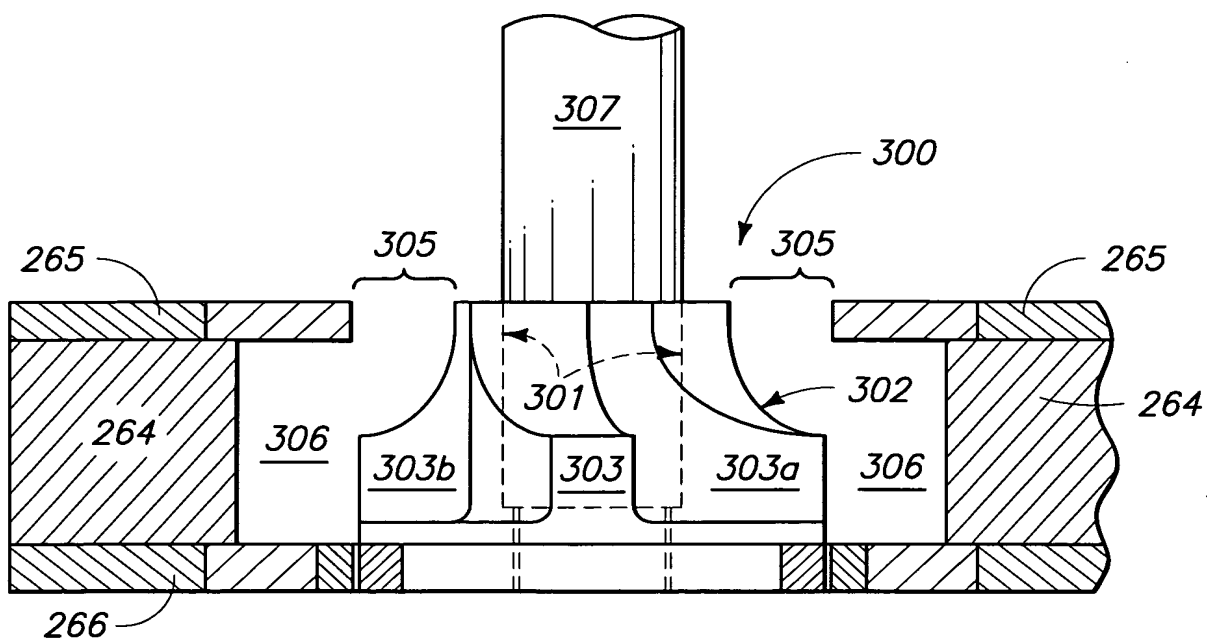




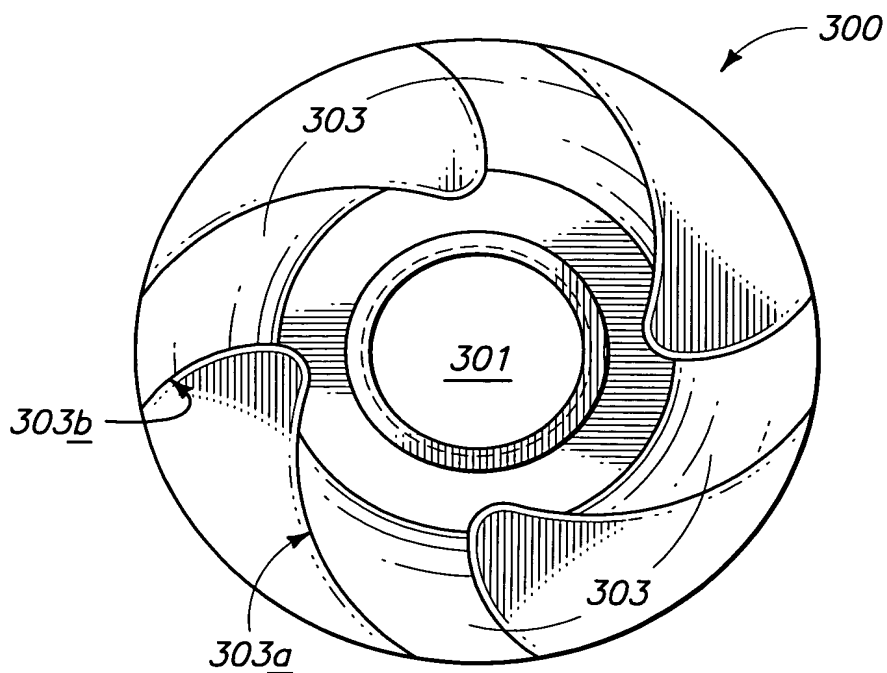


ANNOTATED SHEET

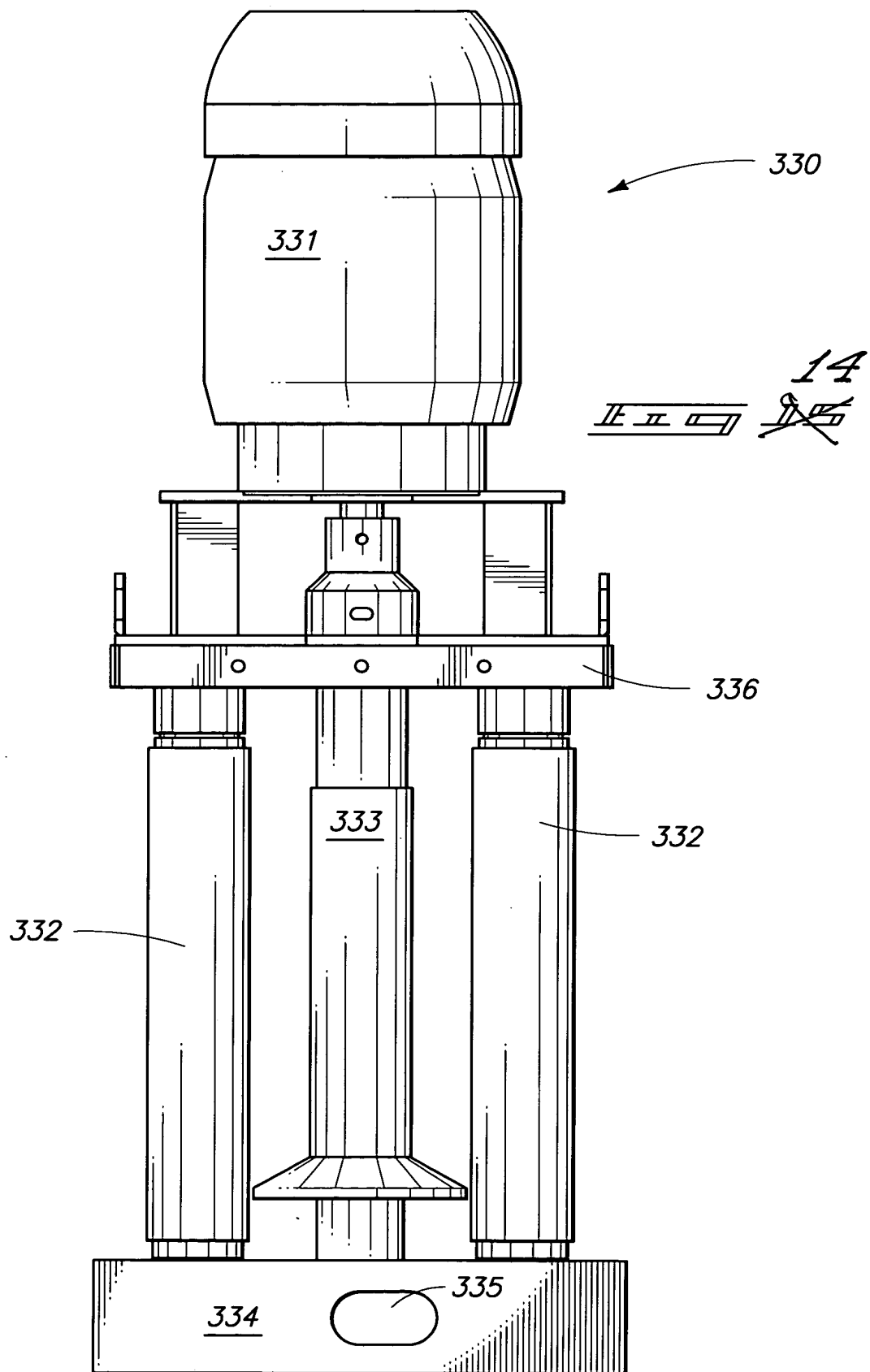
7/8



~~FIG. 12~~



~~FIG. 13~~



## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. .... 10/047,198  
 Filing Date ..... October 26, 2001  
 Inventor ..... Gilbert et al.  
 Assignee ..... Pyrotek, Inc.  
 Group Art Unit ..... 3745  
 Examiner ..... Patricia Faison-Ball  
 Attorney Docket No. .... PY2-023  
 Title ..... Molten Metal Pump Particle Passage System

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<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	10/047,198
	Filing Date	October 26, 2001
	First Named Inventor	Ronald E. Gilbert
	Group Art Unit	3745
	Examiner Name	Patricia Faison-Ball
Total Number of Pages in This Submission		Attorney Docket Number PY2-023

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Preliminary Amendment / <del>Response</del> <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input checked="" type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition Routing Slip (PTO/SB/69) and Accompanying Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Small Entity Statement <input type="checkbox"/> Request for Refund	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Additional Enclosure(s) (please identify below): <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">           Return Receipt Postcard.            A \$84.00 Check            PTO-1449 and copies of cited art references         </div>
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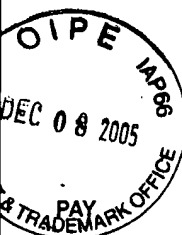
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		Application Number	10/047,198
		Filing Date	October 26, 2001
		First Named Inventor	Ronald E. Gilbert
		Examiner Name	Patricia Faison-Ball
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		Attorney Docket No.	PY2-023
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SUBMITTED BY		Complete (if applicable)	
Name (Print/Type)	Mark W. Hendricksen	Registration No. (Attorney/Agent)	32,356
Signature	<i>Mark W. Hendricksen</i>	Telephone	509-624-4276
		Date	1-2-04

## WARNING:

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Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Inventors: Ronald E. Gilbert et al.

Title: MOLTEN METAL PUMP PARTICLE PASSAGE SYSTEM

Assignee: Pyrotek, Inc.

## INFORMATION DISCLOSURE STATEMENT

References -- See Attached Form PTO-1449

## REMARKS

The citations listed, copies attached, may be material to the examination of the subject application and are therefore submitted in compliance with the duty of disclosure defined in 37 CFR §1.56. The Examiner is requested to make these citations of official record in this application. No admission is made regarding whether all the submitted references are prior art.

The materials cited are presented to assist in and expedite examination of this application. The present invention is considered to be patentable over the cited materials. Expeditious examination and allowance of this application as a patent are therefore urged in order that the public may benefit from the disclosure and commercialization of the invention.

Respectfully submitted,

Date: 10-26-01Inventor: Ronald E. Gilbert  
Ronald E. GilbertDate: 10/26/01Inventor: Mark A. Palmer  
Mark A. PalmerDate: 10/26/01Attorney: Mark W. Hendricksen  
Mark W. Hendricksen  
Reg. No. 32,356

Form PTO-1449

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICEATTY. DOCKET NO.  
PY2-023

SERIAL NO.

LIST OF ART CITED BY APPLICANT  
(Use several sheets if necessary)APPLICANT  
Pyrotek, Inc.

FILING DATE

GROUP

## U.S. PATENT DOCUMENTS

*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	AA					
	AB					
	AC					
	AD					
	AE					
	AF					
	AG					
	AH					
	AI					
	AJ					
	AK					
	AL					

## FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country	Class	Subclass	Translation	
						Yes	No
	AM						
	AN						
	AO						
	AP						
	AQ						

## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)

	AR		PCT Application No. WO 98/25031, Applicant and Inventor: COOPER
	AS		
	AT		

EXAMINER

DATE CONSIDERED

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. .... 10/047,198  
 Filing Date ..... October 26, 2001  
 Inventor ..... Gilbert et al.  
 Assignee ..... Pyrotek, Inc.  
 Group Art Unit ..... 3745  
 Examiner ..... Patricia Faison-Ball  
 Attorney's Docket No. .... PY2-023  
 Title ..... Molten Metal Pump Particle Passage System

PRELIMINARY AMENDMENT

To: Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

VIA EXPRESS MAIL

From: Mark W. Hendricksen (Tel. 509-624-4276; Fax 509-838-3424)  
 Wells St. John P.S.  
 601 West First Avenue, Suite 1300  
 Spokane, WA 99201-3828

Please enter the following amendments prior to examining the above-identified application.

AMENDMENTS

## **In the Claims**

Claim 1 (original) A molten metal pump system comprising:

a pump framework;

a pump motor mounted on the pump framework;

a pump base attached to the pump framework, the pump base including an  
impeller aperture with interior walls;

an impeller shaft attached to the pump motor;

an impeller body attached to the impeller shaft and at least partially within  
the impeller aperture in the pump base, the impeller body comprising:

a center portion with a shaft aperture therein;

a plurality of vanes extending outward from the center portion, each  
vane including a radially outward end, an input side, and an  
output side; and

wherein a particle relief passageway is defined between the radially outward  
end of the plurality of vanes on the impeller and the interior walls of  
the impeller aperture, the particle relief passageway being a  
predetermined size to allow particles of a predetermined size to pass  
between the plurality of vanes and the interior walls of the impeller  
aperture of the pump base.

Claim 2 (original) A molten metal pump system as recited in claim 1, and  
further wherein the impeller body is wholly within the impeller aperture  
in the pump base.

Claim 3 (original) A molten metal pump system comprising:

a pump framework;

a pump motor mounted on the pump framework;

a pump base attached to the pump framework, the pump base including an  
impeller aperture with interior walls;

an impeller shaft attached to the pump motor;

an impeller body attached to the impeller shaft and at least partially within  
the impeller aperture in the pump base, the impeller body comprising:

a center portion with a shaft aperture therein;

a plurality of vanes extending outward from the center portion, each  
vane including a radially inward end, a radially outward end, an  
input side, an output side, a leading surface, a trailing surface, a  
vane width between the leading surface and the trailing surface;  
the plurality of vanes being tapered at the input side from the  
radially inward end to the radially outward end, thereby creating  
a shoulder on the radially outward end of the plurality of vanes;  
and

wherein a predetermined particle relief passageway is defined between the  
plurality of vanes on the impeller, the predetermined partial relief  
passageway being sized to allow particles of a predetermined size to  
pass between the plurality of vanes and the interior walls of the  
impeller aperture of the pump base.



Claim 4 (original) A molten metal pump system as recited in claim 3, and further wherein the impeller body is wholly within the impeller aperture in the pump base.

Claim 5 (new) A molten metal pump impeller system comprising:  
an impeller body comprising:

- a center portion with a shaft aperture therein;

- a plurality of vanes extending outward from the center portion, each vane including a radially inward end, a radially outward end, an input side, an output side, a leading surface, a trailing surface, a vane width between the leading surface and the trailing surface; and

- wherein the vane width is tapered from the input side to the output side.

Claim 6 (new) A molten metal pump impeller system as recited in claim 5, and further comprising an annular base at the output side of the plurality of vanes.

Claim 7 (new) A molten metal pump impeller system as recited in claim 6, and further wherein the entire vane width is tapered from the input side to the annular base.

Claim 8 (new) A molten metal pump impeller system as recited in claim 5,  
and further wherein the input side is the vertically upward side.

Claim 9 (new) A molten metal pump impeller system as recited in claim 5,  
and further wherein the plurality of vanes are tapered at the input side  
from the radially inward end to the radially outward end, thereby  
creating a shoulder on the radially outward end of the plurality of  
vanes.

Claim 10 (new) A molten metal pump impeller system as recited in claim 5,  
and further wherein the leading surface is convex.

Claim 11 (new) A molten metal pump impeller system comprising:  
an impeller body comprising:

- a center portion with a shaft aperture therein;

- a plurality of vanes extending outward from the center portion, each  
vane including a radially inward end, a radially outward end, an  
input side, an output side, a leading surface, a trailing surface, a  
vane width between the leading surface and the trailing surface;  
and

- wherein the leading surface is convex.

Claim 12 (new) A molten metal pump impeller system as recited in claim 11,  
and further comprising an annular base at the output side of the  
plurality of vanes.

Claim 13 (new) A molten metal pump impeller system as recited in claim 12,  
and further wherein the entire vane width is tapered from the input  
side to the annular base.

Claim 14 (new) A molten metal pump impeller system as recited in claim 11,  
and further wherein the input side is the vertically upward side.

Claim 15 (new) A molten metal pump impeller system as recited in claim 11,  
and further wherein the plurality of vanes are tapered at the input side  
from the radially inward end to the radially outward end, thereby  
creating a shoulder on the radially outward end of the plurality of  
vanes.

## REMARKS

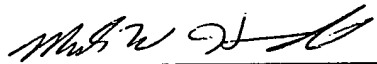
Claims 5-15 are added. Claims 1-15 are in the application for consideration.

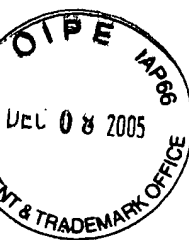
Applicant is hereby submitting the attached Preliminary Amendment to the application, along with a Supplemental Information Disclosure Statement for consideration by the Examiner. No new matter is added and there is complete support in the Specification for the additional claims.

This application is believed to be in immediate condition for allowance, and action to that end is requested.

Respectfully submitted,

Dated: 1-2-04

By:   
Mark W. Hendricksen  
Reg. No. 32,356



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application Serial No. .... 10/047,198  
Filing Date ..... October 26, 2001  
Inventorship ..... Gilbert et al.  
Assignee ..... Pyrotek, Inc.  
Group Art Unit ..... 3745  
Examiner ..... Patricia Faison-Ball  
Attorney's Docket No. .... PY2-023  
Title ..... Molten Metal Pump Particle Passage System

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT**

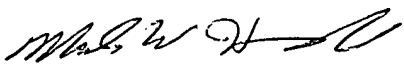
References - See Attached Form PTO-1449

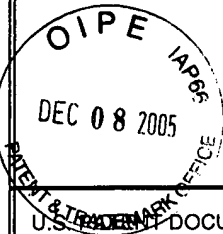
In compliance with 37 C.F.R. §§ 1.56, 1.97 and 1.98, your attention is directed to the United States patents and other references listed on the attached Form PTO-1449. Copies of the cited art are attached hereto. No admission is made regarding whether all the submitted references are prior art.

This Supplemental Information Disclosure Statement is being filed within three months of the filing date of the application or before the mailing of a first Office Action on the merits, whichever occurs last. Therefore, no fee is believed to be required. However, in the event that a fee is required for filing this Supplemental Information Disclosure Statement, please charge the fee specified under 37 C.F.R. § 1.17(p) to Deposit Account No. 23-0925.

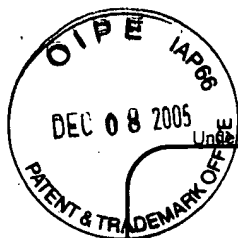
Respectfully submitted,

Dated: 1-3-04

By:   
Mark W. Hendricksen  
Reg. No. 32,356

Form PTO-1449		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. PY2-023		SERIAL NO. 10/047,198	
<div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  </div> <div> <p>LIST OF ART CITED BY APPLICANT (Use several sheets if necessary)</p> </div> </div>				APPLICANT: Gilbert et al.			
				FILING DATE October 26, 2001		GROUP 3745	
<b>U.S. PATENT DOCUMENTS</b>							
*Examiner's Initials	AA	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	AA	5,470,201	11/28/95	Gilbert et al.			
	AB	5,634,770	06/03/97	Gilbert et al.			
	AC	5,944,496	08/31/99	Cooper			
	AD	6,468,039 B1	10/22/02	Lehman			
	AE						
	AF						
	AG						
	AH						
	AI						
<b>FOREIGN PATENT DOCUMENTS</b>							
		Document Number	Date	Country	Class	Subclass	Translation
							Yes No
	AJ						
	AK						
	AL						
<b>OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)</b>							
	AM						
	AN						
	AO						
EXAMINER		DATE CONSIDERED					
<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>							

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## TRANSMITTAL FORM

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Application Number	10/047,198
Filing Date	October 26, 2001
First Named Inventor	Gilbert et al.
Art Unit	3745
Examiner Name	Ninh H. Nguyen
Attorney Docket Number	PY5-010

### ENCLOSURES (Check all that apply)

<input type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input checked="" type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement  <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): Return Receipt Postcard. Check #148625 for \$120.00.
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Remarks

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### SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Wells St. John P.S.		
Signature			
Printed name	Mark W. Hendricksen		
Date	12-8-05	Reg. No.	32,356

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